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Before The  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554

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FEDERAL COMMUNICATIONS COMMISSION  
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In the Matter of	)	
	)	
Amendment of Parts 1, 21, and 74	)	MM Docket No. 97-217
to Enable Multipoint Distribution	)	
Service and Instructional Television	)	File No. RM-9060
Fixed Service Licensees to Engage	)	
in Fixed Two-Way Transmissions	)	
_____	)	

**COMMENTS**

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## **EXECUTIVE SUMMARY**

The Catholic Television Network (CTN) generally supports the concept of modifying the Commission's Rules to permit two-way transmissions in the 2.5 GHz band as proposed in the Notice of Proposed Rulemaking (NPRM). CTN believes that the Commission's efforts in the current docket will potentially enable ITFS licensees and the students they serve to participate in a comprehensive system of interactive video, voice and data services for classroom instruction.

However, the Commission must carefully balance proposals that would expand the commercial use of ITFS spectrum against the need to preserve ITFS spectrum for instructional purposes. Accordingly, in these comments and the attached joint engineering exhibit, CTN provides its evaluation of the impact of the proposed rules on the interference environment for ITFS stations and the ability of educators to use ITFS as an educational resource. CTN recommends a number of rule modifications which it believes benefit all affected parties.

Brute Force Interference. CTN believes that a two-way transmission system in the 2.5 GHz band should be implemented only if steps are taken to ensure that "downstream" transmissions are sufficiently protected from interference from "upstream" transmissions. Of particular concern is the problem of brute force interference. The placement of multiple response transmitters within the service area of non-co-channel and non-adjacent-channel ITFS stations creates a serious threat of brute force interference which does not exist in the current architecture for ITFS and MDS stations. In these comments, CTN

outlines a set of criteria regarding installation of response station equipment to alleviate the potential threat of brute force interference and to facilitate identification of sources of actual interference.

Co- and Adjacent-Channel Interference. CTN also believes that upstream transmissions on frequencies co- and adjacent-channel to ITFS downstream transmissions create a serious threat of harmful interference. CTN recommends adoption of a guardband to protect against such interference. One alternative would be to adopt a 24 MHz guardband; this plan would also permit use of filters to mitigate brute force overload. A second alternative is to provide only 6 MHz of guardband. The second alternative could potentially be less complicated by affecting fewer stations.

Implementation of either guardband approach would also facilitate the future growth and expansion of ITFS. Under the regime proposed in the NPRM, modification of ITFS may be precluded because it would be virtually impossible to modify ITFS facilities and provide interference protection to co- and adjacent-channel response station hubs. Imposing frequency separation would avoid the complexities of co- and adjacent-channel interference protection.

Modifications to Proposed Technical Rules. If the Commission does adopt rules permitting upstream transmissions on frequencies co- and adjacent-channel to ITFS downstream transmissions, then it must modify a number of rules proposed in the NPRM. For example, the proposed method of interference analysis for response stations is unduly complicated and represents an

unwarranted risk of interference to ITFS receive sites. The Commission also must clarify the required parameters of "shared" facilities, and ensure that the modification of any response station hub authorization requires prior Commission authorization.

ITFS Programming Requirements. With respect to programming requirements for stations operating with digital equipment, CTN believes that 25% of the capacity should be used or reserved for ITFS. The availability of additional capacity on ITFS frequencies through digitalization would be a welcome and needed addition to educational resources. The ITFS programming requirements should reflect this increased capacity, and also permit use of data transmissions to satisfy programming requirements.

Autonomy of ITFS Stations. CTN also recommends that the Commission take steps to protect the autonomy of ITFS stations and their ability to operate in the event that a station's commercial partner becomes insolvent. The Commission has an existing policy which requires that an ITFS licensee have access to equipment to operate its station after termination of an excess capacity lease. However, the cost of digital equipment, the expense of maintaining a digital transmission system, and joint operation may complicate an ITFS operator's ability to obtain access to equipment necessary to continue its operation.

CTN recommends that the Commission's policy on purchase of equipment at the end of a lease term include reference to dedicated and common equipment, or the equivalent thereof. An ITFS licensee should have access to all equipment

necessary for continued distribution of its signal consistent with its distribution during the lease term. CTN also recommends that wireless cable operators implementing a digital system should be required to establish a performance bond or escrow account with sufficient funds to ensure uninterrupted operation of participating ITFS stations, in the event the wireless cable operator becomes insolvent. The funds should become available if the lessee fails to commence commercial operations or ceases commercial operation.

Application Processing Rules. The proposed application processing rules, which provide for an initial one-week filing window for response stations hub and booster stations applications, are a recipe for administrative disaster. The number of applications that are likely to be filed after the effective date of the new rules is astonishing. To avoid this avalanche of paper, CTN recommends that the Commission designate the first five business days of every month as filing days for ITFS and MDS two-way service applications. Regular and periodic filing windows would allow applicants to schedule their filing dates in advance and provide the Commission's staff with an opportunity to release a public notice listing applications filed during the window. CTN also supports the concept of instituting parallel processing procedures for ITFS and MDS applications. Finally, CTN agrees with the Commission's conclusion that staff review of ITFS and MDS applications is necessary.

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COMMENTS

Pursuant to Section 1.415 of the Commission's Rules, the Catholic Television Network ("CTN"), by its undersigned attorneys, hereby files these comments in response to the Notice of Proposed Rulemaking, FCC 97-360 (released Oct. 10, 1997) ("NPRM"), in the above-referenced docket.

As an association of educators using "distance learning" technologies, CTN has reviewed the rules proposed in the NPRM from the point of view of their impact on the technical operation of Instructional Television Fixed Service ("ITFS") stations and on the ability of educators to use ITFS as an instructional resource. CTN supports, in principle, the provision of two-way services in the 2.5 GHz band. Nevertheless, in these comments and the attached engineering exhibit, CTN recommends a number of modifications to the rules proposed in the NPRM. CTN's proposals are primarily directed at ensuring interference-free operation of ITFS stations and their continued use for instructional purposes.



In Sections III, IV and V, CTN discusses interference issues associated with providing two-way transmissions on ITFS and Multipoint Distribution Services ("MDS") frequencies. As explained in Section III, upstream transmissions pose a serious and substantial threat of brute force overload (or, blanketing interference) into non-co-channel and non-adjacent-channel ITFS receive sites. CTN proposes reasonable steps to virtually eliminate this problem.

In Section IV, to avoid interference calculations which are unduly complicated and represent an unwarranted risk of co- and adjacent-channel interference, CTN recommends that the Commission not permit upstream transmissions on frequencies co- and adjacent-channel to frequencies used for ITFS downstream transmissions. CTN also outlines two alternative proposals to effectuate this recommendation and still permit two-way transmissions in the 2.5 GHz band. These two alternatives would also avoid the preclusive effect of protection requirements for response station hubs on the growth of ITFS. In Section V, CTN discusses aspects of the technical rules proposed in the NPRM which must be changed if the Commission does not adopt CTN's recommendations and, instead, permits upstream transmissions on frequencies co- and adjacent-channel to ITFS downstream transmissions.

Sections VI, VII and VIII discuss issues related to preserving ITFS as an educational resource. In Section VI, CTN recommends guidelines for ITFS programming requirements on digital channels. Section VII discusses issues related to ITFS autonomy. Section VIII contains alternative proposals for

processing applications filed to implement rules and policies adopted in this proceeding.

CTN supports efforts to enhance the usefulness of ITFS as an educational resource. However, the proposed new regime for ITFS and MDS is complex in nature and raises problems with no easy solutions. To this end, CTN has entered into an ongoing dialog with representatives of the parties filing the Petition. CTN also has devoted much time and effort to analyzing the proposals in the NPRM, with the goal of improving rather than obstructing proposals to implement two-way transmissions in the 2.5 GHz band. CTN believes that its recommendations benefit all affected parties, and it will continue to work toward finding reasonable solutions to the issues raised in this proceeding.

### **INTRODUCTORY STATEMENT**

#### **I. CTN REPRESENTS A SUBSTANTIAL POPULATION OF ITFS LICENSEES AND STUDENTS SERVED BY ITFS STATIONS.**

CTN is an association of 18 Roman Catholic Archdioceses and Dioceses throughout the United States that hold ITFS licenses for the distribution of instructional programming in diocesan schools.<sup>1</sup> CTN's members have been involved with ITFS since the Commission first established ITFS as a licensed

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<sup>1</sup> CTN represents Archdioceses and Dioceses throughout the United States, including the San Francisco Bay Area, Boston, Brooklyn, Chicago, Dallas, Detroit, Los Angeles, New York, Orange, Orlando, Rockville Centre, San Bernardino, Youngstown, Buffalo, St. Louis, and Wichita.

service. Some of CTN's members have held ITFS licenses for more than 30 years. CTN and its members have actively participated in the Commission's ITFS proceedings, and their views over the years have framed important issues and helped shape ITFS into a unique and valuable educational resource. As an interested party, CTN filed comments and reply comments during the initial round of comments on the Petition for Rulemaking (RM-9060) which led to the NPRM.

Major modifications to the rules and policies governing ITFS, like those proposed in the NPRM, have a significant impact on CTN's members. CTN's members operate some of the largest and most complex ITFS facilities in the country, serving, in some cases, hundreds of receive sites, and using the latest in digital compression and transmission technology. CTN estimates that its members provide educational programming to more than a half million students throughout the United States. CTN's members also provide programming distributed by cable systems, which is broadcast 24 hours per day in some areas, reaching millions of households.

Through partnerships with wireless cable operators, CTN's members also have an interest in the ability of wireless cable operators to use their licensed and leased spectrum for successful commercial services. CTN's foremost concern, however, has always been to ensure that its members can continue to provide distance learning services to students in public and private schools. For this reason, while the comments of CTN express support -- in principle -- for rules

which will enable two-way communications and authorize generally digital transmissions, the comments stress the importance of safeguarding ITFS from interference and ensuring that the educational goals of ITFS will continue to be met.

## **II. ENHANCED SERVICES ON ITFS FREQUENCIES MUST BE IMPLEMENTED FOR THE BENEFIT OF INSTRUCTIONAL USES.**

For the past 30 years, the Commission has reserved the ITFS spectrum for instructional use, the only radiofrequencies designated for such services in the United States.<sup>2</sup> This spectrum reservation is grounded in the Commission's recognition of the "critical importance of education, and the significant role that ITFS can play in providing improved educational opportunities for all."<sup>3</sup> Accordingly, the rules require that ITFS licensees use their licensed facilities for the formal education of students.<sup>4</sup>

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<sup>2</sup> See Educational Television, 39 FCC 846 (1963), recon. denied, 39 FCC 873 (1964).

<sup>3</sup> Instructional Television Fixed Service, 75 RR 2d 755, 757 (1994) ("Channel Loading Order"); see also Instructional Television Fixed Service, 101 FCC 2d 49, 78, 81 (1985) ("The ITFS spectrum is primarily intended for the transmission of formal education for schools"; "formal education is the cornerstone of the ITFS service"), recon. denied, 59 RR 2d 1355 (1986), vacated in part sub nom. Telecommunications Research & Action Center v. FCC, 836 F.2d 1349 (D.C. Cir. 1988).

<sup>4</sup> See Educational Television, 39 FCC at 852-53. "Instructional television fixed service stations are intended primarily to provide a formal educational and cultural development [service] in aural and visual form, to students enrolled in accredited public and private schools, colleges and universities." 47 C.F.R. § 74.931(a)(1).

This spectrum reservation has been useful in expanding the ability of educators to reach students and communities.<sup>5</sup> Continued access to ITFS services is critical to efficient and effective education in the future. As CTN has pointed out previously, the per student cost of education continues to increase.<sup>6</sup> In order to respond to these increasing costs, educators need new and efficient educational tools.<sup>7</sup> Advanced telecommunications services are increasingly being used as an integral part of the educational curriculum to fulfill this need.<sup>8</sup> The availability of additional capacity on ITFS frequencies through digitalization and to enhanced services through two-way data transmissions would be a welcome addition to educational resources. Indeed, the U.S. Department of Education has noted that education, like other industries, must implement technological solutions to increase productivity:

[A] possible reason for the rise in cost of higher education over the long term is a lack of increase in productivity in higher education. Whereas many sectors of the U.S. economy, particularly manufacturing and agriculture, have used technology and innovation to either increase the quantity or quality of goods provided with no

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<sup>5</sup> See, e.g., The National Public Telecommunications Infrastructure Act of 1994, Hearings on S. 2195 Before the Subcomm. on Communications of the Senate Comm. on Commerce, Science and Transportation, 103d Cong., 2d Sess., ("Statement of Dr. George D. Connick, President, University of Maine at Augusta") ("Connick Statement").

<sup>6</sup> See U.S. Dep't of Education, The Cost of Higher Education (March 1996) ("Education Cost Report"); U.S. Department of Commerce, Statistical Abstract of the United States 1996, at 163.

<sup>7</sup> See, e.g., Connick Statement.

<sup>8</sup> See National Center for Education Statistics, Advanced Telecommunications in U.S. Public Elementary and Secondary Schools, Fall 1996 (Feb. 1997).

corresponding increases in resources used, higher education is still provided in largely the same way it was when the nation was founded. When productivity growth in a particular sector of the economy lags behind the rest of the economy, the cost of providing that good or service increases.<sup>9</sup>

This is not the first proceeding in which the Commission has had the opportunity to assist educators in implementing telecommunications solutions as educational resources. The Commission has already found that the opportunity for schools to use interactive data services would serve as a significant complement to traditional classroom instruction by bringing children into the information era.<sup>10</sup> Indeed, the Commission is implementing a program on universal telecommunication services for schools and libraries pursuant to Section 254 of the Telecommunications Act of 1996 (47 U.S.C. § 254), which is designed to ensure that "no one is barred from benefiting from the power of the Information Age."<sup>11</sup> The Commission's efforts in the current docket will potentially enable ITFS licensees and the students they serve to participate in a comprehensive system of interactive video, voice and data services for classroom instruction. However, the Commission must carefully balance proposals that would expand the

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<sup>9</sup> Education Cost Report, at 14.

<sup>10</sup> See Amendment of the Commission's Rules to Provide for Operation of Unlicensed NII Devices in the 5 GHz Frequency Range, 12 FCC Rcd 1576, 1583-84 (1997).

<sup>11</sup> Federal-State Joint Board on Universal Service, 12 FCC Rcd 8776, 9003 (1997) (quoting Joint Explanatory Statement of the Committee of the Conference, H.R. Rep. No. 458, 104th Cong., 2d Sess., at 132-33).

commercial use of ITFS spectrum against the need to preserve ITFS spectrum for instructional purposes.<sup>12</sup>

### **COMMENTS: INTERFERENCE ISSUES**

#### **III. THE COMMISSION MUST ADOPT RULES WHICH PRECLUDE POTENTIAL BRUTE FORCE INTERFERENCE INTO ITFS STATIONS.**

Since the Petition for Rulemaking was filed, CTN has reviewed the proposals therein with particular concern for the potential for harmful interference into existing ITFS receive sites. Although the Commission modified some of the Petitioners' proposals, the rules proposed in the NPRM have not alleviated CTN's concerns regarding brute force overload, or blanketing, interference into non-co-channel and non-adjacent-channel ITFS receivers.

##### **A. Brute Force Overload Poses a Significant Threat to ITFS Receivers.**

As indicated in the attached Joint Engineering Exhibit, placement of multiple response transmitters within the service areas of non-co- and adjacent-channel ITFS stations would create a potential for "brute force" interference which does not exist in the current architecture for ITFS and MDS stations. See Joint Engineering Exhibit, ¶¶ 2-8. CTN raised these concerns in an earlier pleading in

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<sup>12</sup> See Channel Loading Order, 75 RR 2d at 757 ("[t]he policy debate at issue is not the mechanism by which ITFS channel time is made available to wireless cable operators. . . but how we preserve the primary purpose of ITFS in light of our proposal here").

this docket filed in November 1997.<sup>13</sup> Petitioners have attempted to downplay the danger of brute force overload interference, stating that "the potential for ITFS downconverters to suffer such interference is not as great as CTN fears."<sup>14</sup> However, this statement is directly contrary to the very recent position of the Wireless Cable Association International ("WCA") in the Commission's proceeding establishing the Wireless Communications Service ("WCS").<sup>15</sup>

In a Report and Order issued last year, the Commission established the WCS in the 2.3 GHz band, approximately 140 MHz below the lower edge of the 2.5 GHz ITFS/MDS band. The Commission considered, but initially declined to impose, technical restrictions to protect ITFS and MDS licensees from blanketing interference. The WCA petitioned for expedited reconsideration of the Report and Order, raising concerns over harmful blanketing interference, stating that the "users of ITFS facilities require immediate relief . . . to avoid serious and irreparable injury."<sup>16</sup>

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<sup>13</sup> See CTN's Request for Supplemental Comment Period and Extension of Time (filed Nov. 25, 1997) ("November Request").

<sup>14</sup> See Petitioners' Response to Request for Supplemental Comment Period and Extension of Time, at 3 (filed Dec. 1, 1997) ("Petitioners' Response").

<sup>15</sup> See Amendment of the Commission's Rules to Establish Part 27, the Wireless Communications Service, 12 FCC Rcd 10785 (1997). WCS is designed to provide a wide variety of communications, including interactive data services and return links for interactive cable and broadcasting services.

<sup>16</sup> WCA Petition for Expedited Reconsideration, GN Docket No. 96-228, at ii (filed Mar. 10, 1997).



In support of its Petition, the WCA submitted a detailed engineering statement demonstrating that "any WCS transmitter with an EIRP of greater than 82 W will cause the MDS/ITFS block downconverters to overload."<sup>17</sup> The WCA recommended that the WCS EIRP should be limited to no more than 20 watts to provide a safety margin of 6 dB to 10 dB below the overload point. In a Memorandum Opinion on Order released on April 2, 1997, the Commission accepted the WCA's arguments and imposed the requested 20 watt power cap.<sup>18</sup>

Just days after the WCA filed its petition in the WCS proceeding, the Petitioners, with the support of the WCA, filed the Petition for Rulemaking in this proceeding, and requested permission to deploy essentially unlimited numbers of response station transmitters operating in the ITFS and MDS bands at 2000 watts EIRP. See NPRM, ¶ 42. If WCS devices operating at above 20 watts with 140 MHz of guardband pose a devastating problem to ITFS downconverters, then surely response station transmitters operating at 2000 watts with no guardband at all would present a much greater problem to ITFS downconverters.

In the NPRM, the Commission proposed to place a limit of 63 watts EIRP (18 dBW) on response station transmitters. NPRM, ¶ 42. However, even at this reduced power level, response station transmitters will be operating at several times the power limit that the WCA insisted upon for WCS devices. It is essential,

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<sup>17</sup> See WCA Petition for Expedited Reconsideration, Engineering Statement, at 3.

<sup>18</sup> Amendment of the Commission's Rules to Establish Part 27, the Wireless Communications Service, 12 FCC Rcd 3971, 3983-86 (1997).

under these circumstances, that the Commission adopt rules, as CTN proposes below, that protect ITFS receivers from the threat of brute force overload.

In response to CTN's November Petition, the Petitioners proposed several means of dealing with the brute force overload problem. However, none of these suggestions resolve the problem. First, the Petitioners stated that the installer of response station equipment will be aware of the locations of ITFS fixed receive sites and will avoid installations that cause brute force interference.<sup>19</sup> However, there is no requirement proposed that response stations be professionally installed.<sup>20</sup> Moreover, the NPRM does not propose that subscribers be prohibited from relocating their equipment. Further complicating matters, brute force overload affects non-co-channel and non-adjacent-channel receive sites, and the proposed rules make no allowance for studying these sites.

Second, the Petitioners stated that if a response station transmitter causes brute-force overload, the Commission can simply require the offending transmitter to cease operations. However, this is not a simple task and would place a new and substantial burden on ITFS licensees. An ITFS licensee whose receive site suffers from intermittent interference would be required to identify the offending response station transmitter and demonstrate that the response station was the cause of interference at the receive site. Some CTN members have hundreds of receive

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<sup>19</sup> Petitioners' Response, at 3.

<sup>20</sup> See Petition for Rulemaking (RM-9060), Ex. D, "Rationale for Two-Way & Distributed Transmission Operations of Wireless Cable Systems," at 6.

sites, any one of which could suffer intermittent interference as a result of two-way data operations.

Once again, the Petitioners' rationale is inconsistent with the WCA's position in the WCS proceeding. According to the WCA:

Any material WCS interference will undercut the ability of local educators (whether or not they are affiliated with a wireless cable operator) to deliver course material to their students as scheduled, thereby defeating the primary purpose of the ITFS service.<sup>21</sup>

Using this reasoning, the WCA rejected a post hoc interference resolution method for WCS based on the adverse impact on wireless cable stations.<sup>22</sup> As the Petitioners know, a post hoc interference resolution process remains inconsistent with the nature of ITFS.

B. The Proposed Rules Must Be Revised to Protect ITFS Receivers from Brute Force Overload.

A two-way transmission system can be implemented in the 2.5 GHz band only if steps are taken to ensure that ITFS receivers are adequately protected from brute force overload interference. In CTN's November Request, CTN proposed "refarming" the E-, F-, G- and H-Channel groups to create a separate band for upstream transmissions 24 MHz away from ITFS downstream transmitters. The 24 MHz separation was proposed to allow the use of filters to mitigate brute force overload.

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<sup>21</sup> WCA Petition for Expedited Reconsideration, at 17.

<sup>22</sup> WCA Reply, GN Docket No. 96-228 at 14 (filed Mar. 25, 1997).

After further consideration, CTN's engineering consultants have expanded on their earlier proposal. See Joint Engineering Exhibit, ¶¶ 14-18. This proposal requires implementation of a set of criteria that would limit the type of response transmitters and their power levels, and would include notification procedures to ITFS licensees which must be followed for installation of response transmitters. A step-by-step outline of this proposal follows:

1. An applicant for response station hub authorization must certify that:
  - a. All response station transmitters will be at fixed locations. No mobile, portable or itinerant equipment will be permitted to be used with the system.
  - b. All response station transmitters will utilize directional transmitting antennas.
  - c. All response station transmitting antennas will be installed by qualified technicians, employed by the response station hub licensee. No customer-installed equipment will be permitted.
2. Response stations will be limited to a transmitter power output (TPO) of no greater than +33 dBm (2 Watts) and an EIRP of no greater than +48 dBm (63 Watts), as adjusted for the actual bandwidth used by the response station transmitter.

Note: For example, a response station transmitter employing a bandwidth of 3 MHz would have to reduce its allowable TPO and EIRP by 3 dB [ $10 \log_{10} (3 \text{ MHz}/6 \text{ MHz})$ ]; a response station transmitter employing a bandwidth of 1 MHz would have to reduce its allowable TPO and EIRP by 7.8 dB [ $10 \log_{10} (1 \text{ MHz}/6 \text{ MHz})$ ]; a response station transmitter employing a bandwidth of 100 kHz would have to reduce its allowable TPO and EIRP by 17.8 dB [ $10 \log_{10} (0.1 \text{ MHz}/6 \text{ MHz})$ ].

3. Prior to installation of any response station transmitter within 1960 feet of an ITFS receive site, the response station hub operator would be required to send a notice to the affected

ITFS licensee of the location of the proposed response station. See Joint Engineering Exhibit, Figure 1.

4. A response station hub operator would not be permitted to locate a response transmitter within the "Equipment Test Zone" outlined in Figure 1, unless it had completed tests to establish that no blanketing interference is caused to the ITFS receive site. The Equipment Test Zone is an area in front of the receiving antenna where placement of a response station would pose the greatest risk.
5. To locate a response station within the Equipment Test Zone, the response station hub operator would be required to notify the ITFS licensee that it desires to conduct tests of blanketing interference at least 30 days prior to the date on which it would like to turn the equipment over to the customer. It would be the responsibility of the response station hub licensee to contact the ITFS licensee to arrange a date for testing.
6. For any such tests, all existing response stations within the entire notification zone would have to be on the air during the test to ensure that the worst case total power to the first active device of the downconverter was being tested, or, alternatively, the tests must be performed at 6 dB in excess of the power proposed for the response station.
7. The response station hub licensee would be required to send a certified report of the test results to the ITFS licensee. If the test results are negative, and the hub licensee intends to install the response station at the site, then it must deliver the certification to the ITFS licensee prior to the date for customer acceptance of the equipment.

These steps by response station hub licensees would alleviate the potential threat of blanketing interference, and would facilitate identification of the source of any actual interference. However, to ensure that the danger of brute force overload is completely eliminated, the Commission should also adopt a rule which requires that the response station hub licensee must correct any actual interference into ITFS receivers that may occur.

C. **The Commission Should Not Relax Out-of-Band Emissions Limits for Response Station Transmitters.**

Another threat to non-co-channel and non-adjacent-channel ITFS transmissions is the Commission's proposal to relax out-of-band emissions limits for response station transmitters. NPRM, ¶¶ 19-23. As explained in the attached Joint Engineering Exhibit (¶¶ 22-24), the relaxed limits would result in serious interference to ITFS receive sites even if separated in frequency from the response station. Accordingly, CTN recommends that the limit be at least -48 dBc for signals within  $\pm 6$  MHz of the response station band edge and at least -60 dBc for signals greater than  $\pm 6$  MHz of the response station band edge. Moreover, if the Commission permits response station EIRPs of greater than +48 dBm (but in no event greater than +63 dBm), then a more stringent out-of-band specification should be adopted dB for dB, as explained in the Joint Engineering Exhibit. See Joint Engineering Exhibit, ¶ 25.

**IV. THE COMMISSION MUST PROVIDE A GUARDBAND TO PROTECT CO- AND ADJACENT CHANNEL ITFS STATIONS FROM HARMFUL INTERFERENCE CAUSED BY UPSTREAM TRANSMISSIONS.**

As discussed in the attached Engineering Exhibit, the method of analyzing the potential for harmful interference into co- and adjacent channel stations proposed in the NPRM is unduly complicated and represents an unwarranted risk of new interference to existing ITFS stations. See Joint Engineering Exhibit, ¶ 8. Moreover, were the Commission to authorize two-way services as proposed in the

NPRM, the growth and expansion of ITFS would be stifled because it would be virtually impossible to modify ITFS facilities and still provide interference protection to co- and adjacent-channel response station hubs. See id., ¶¶ 19-21.

The preclusive effect of installation of response station hubs pursuant to the interference guidelines in the NPRM is a serious concern to CTN because an obligation to protect omnidirectional receive sites could result in a de facto freeze on modifications to existing ITFS stations. See Joint Engineering Exhibit, ¶¶ 19-21. Unlike conventional ITFS and MDS stations of which technical characteristics are known, the desired signal level from a response station transmitter would depend on its type and location. The location of the response station, and even its bandwidth, would not be known in advance, and so, ITFS licensees would have difficulty demonstrating that a proposed modification would not result in interference at the response station hub. Accordingly, as CTN's engineering exhibit explains, modifications to existing ITFS stations would either not be possible, or would be dependent upon obtaining "consent" letters from the hub licensee. See id., ¶ 21.

CTN believes that the best solution to the problem of co- and adjacent-channel interference is to eliminate the potential for such interference by mandating a guardband of at least 6 MHz between upstream and downstream transmissions. It is providing two proposals "Plan A" and "Plan B," which recommend guardbands of 24 MHz and 6 MHz, respectively.

Plan A. Included in the Joint Engineering Exhibit is a proposal (Plan A) to "refarm"<sup>23</sup> the E-, F-, G- and H-Channel Groups to create a band of contiguous ITFS spectrum at 2500-2620 MHz and a band of contiguous spectrum dedicated for response transmissions at 2644-2690 MHz. See Joint Engineering Exhibit, ¶¶ 8-13. This proposal would make available up to 24 MHz of spectrum as a guardband between ITFS point-to-multipoint transmissions and any response transmissions. Imposing frequency separation eliminates problems associated with interference protection requirements for co- and adjacent-channel stations.

Plan B. CTN's Plan A was originally designed to help resolve the problem of brute force overload by establishing a 24 MHz guardband by allowing the use of filters as a practical mitigation tool. Having proposed in Section III of these comments steps to mitigate the problem of brute force overload, CTN recognizes that adequate co- and adjacent-channel interference protection can be provided with a 6 MHz guardband. Accordingly, if the Commission adopts CTN's recommendations set forth in Section III above, the Commission could require that upstream transmissions be separated from downstream transmissions by 6 MHz. It should be noted, however, that if Plan B is used, then the use of filters to mitigate brute force overload would be limited, because such filters can require up to 24 MHz of guardband. See Joint Engineering Exhibit, ¶ 17.

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<sup>23</sup> The term "refarming" refers to a shifting of specific frequencies used by certain stations with no reduction in net available bandwidth to each class of station.



To provide the 6 MHz guardband for Plan B, upstream transmissions in the 2.5 GHz band could simply be restricted to the 36 MHz of spectrum identified as E2, E3, E4, F1, F2, F3. See Joint Engineering Exhibit, ¶¶ 14-18. Plan B would provide a 6 MHz guardband between any ITFS station and upstream transmissions, and would eliminate the need for either an ITFS downstream station or an MDS upstream station to study co- and adjacent-channel interference. As a result, the only interference threat into ITFS stations would be brute force overload, which can be corrected through other means as described above. Moreover, ITFS stations could not cause interference to response station hubs, and so, the placement of such hubs would not have a preclusive effect on growth of ITFS.

Plan A & Plan B. In both Plan A and Plan B, commercial response stations should be permitted to transmit on channels MDS-1 and MDS-2/2A. Thus, both proposals provide substantial spectrum for upstream transmissions, i.e., up to 54 MHz and 48 MHz, respectively. Also, in both proposals, CTN recommends that all 125 kHz response channels at 2686-2690 MHz be reallocated to ITFS, for use as ITFS response transmissions, but not for point-to-multipoint uses.

CTN recognizes that there are certain initial complications associated with these refarming plans. For example, in certain markets, procedures for clearing point-to-multipoint operations in the bands used for upstream transmissions may